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**SYSTEM, METHOD, AND ARTICLE OF MANUFACTURE
FOR AN IMPROVED AUDIO EXPERIENCE FOR ONLINE GAMING**

BACKGROUND OF THE INVENTIONS

Field of the Inventions

[0001] The present inventions relate to the field of electronic audio reproduction. More specifically, the present inventions, in an exemplary embodiment, relate to a system, method of operation, and article of manufacture for providing background music that is related to a context of a software environment. More specifically, the present inventions, in an exemplary embodiment, relate to a system, method of operation, and article of manufacture for providing background music that is appropriate to a context of a game software environment. More specifically, the present inventions, in an exemplary embodiment, may be used to incorporate music already present at a computer in a manner that is appropriate to a context of a game in order to enhance enjoyment for the user and personalize the experience.

Description of the Related Art

[0002] With some software, for example gaming software, music may provide an addition to the ambience of the software. By way of example and not limitation, in certain electronic games, contexts arising from game play may change and it may be desirable to have the background music may change to meet the new situation. Many of these changes in context may be unpredictable, especially multiplayer gaming software environments.

[0003] Although background music ideally adapts to the game's context, a game service or server such as an Internet or other data communications based service or server may not be able to provide background music of a nature appealing to the game users. In part, this may arise from limited bandwidth and/or from latency inherent in data communications environments.

[0004] United States Patent 6,263,496 issued to Meyer et al. for "SELF MODIFYING SCENE GRAPH" teaches a system and method for animation sequencing. In part, portions of software may be created that comprise functions and arguments for those functions useful in creating an animation sequence such as during game play. In subsequent actions, parameters may be passed which are used as arguments to these functions, allowing alteration of animation sequences without creating additional instances of initially encoded functions. Although this may require less bandwidth over a data communications channel, Meyer neither teaches, suggests, or motivates the use of categorization data sent from a server to a second computer operatively connected to the server over a data network where the second computer has access to a plurality of local audio data files, each audio data file associated with at least one of the categories.

[0005] United States Patent 6,243,761 issued to Mogul et al. for "METHOD FOR DYNAMICALLY ADJUSTING MULTIMEDIA CONTENT OF A WEB PAGE BY A SERVER IN ACCORDANCE TO NETWORK PATH CHARACTERISTICS BETWEEN CLIENT AND SERVER" teaches dynamically adjusting a web page by a server in response to measured effective bandwidth and/or latency. This approach would not satisfy game users with respect to background audio as such an approach would entail dynamically changing the quality and possibly content of that audio during game play.

[0006] A need therefore exists to be able to provide background audio, especially background audio of a high quality, that adapts to a context of a software environment and that can adapt to that context during stochastic scenarios.

SUMMARY OF THE INVENTIONS

[0007] In an exemplary embodiment, the present inventions comprise a system for electronically providing audio that is sensitive to a context of which the audio is a part. In a claimed embodiment, such a system may comprise a first computer operatively connected to a data network, the first computer having category data representative of a plurality of categories of audio where the categories are associatable with a context of executable software, and a second computer operatively connected to the server via the data network, the second computer executing at least a portion of the executable software and further having local access a plurality of audio data files, each audio data file being associated with at least one of the categories.

[0008] In an exemplary embodiment, at predetermined intervals, the first computer may periodically determine a context of a state of the software executing in the second computer, which may change over time, and select a category at the first computer in response to the context where the category is associated with the context. Category data are then transmitted to the second computer and selection software at least partially executing in the second computer selects an audio data file local to the second computer in response to the category data transmitted to the second computer. The selected audio data file is then reproduced at the second computer.

[0009] It is understood that the scope of protection is not limited by the summary of an exemplary embodiment set out above, but is only limited by the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] These and other features, aspects, and advantages of the present inventions will become more fully apparent from the following description, appended claims, and accompanying drawings in which:

[0011] **Fig. 1** is a schematic view of an exemplary system layout; and

[0012] **Fig. 2** is a flowchart of an exemplary embodiment of the present system.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0013] In general, throughout this description, if an item is described as implemented in software, it can equally well be implemented as hardware.

[0014] Referring now to **Fig. 1**, a schematic of an exemplary embodiment, first computer 21 is operatively connected to data network 100. In the preferred embodiment, data network 100 is the Internet but can comprise dial-up networks, private networks, local area networks such as 30, and the like, or combinations thereof. Data store 10 local to first computer 21 contains data files whose data are representative of predetermined categories. In an exemplary embodiment, the data are associatable with categories that are themselves associatable with a context of executable software such as audiovisual software. In the description of this exemplary mode, the executable audiovisual software is gaming software but can be other software, by way of example and not limitation instructional software; catalog software, such as travel brochures or other brochures or offerings for sales; and the like.

[0015] The category data are relatively small, typically requiring a few bytes, especially when compared to audio files, referred to generally as “12” and shown in **Fig. 1** as 12a, 12b, and 12c, which can require several thousand bytes per second of high quality audio, by way of example and not limitation such as wave or MPEG layer 3 audio. As used herein, “audio” may comprise music, vocals, speech, sound effects, and the like, or combinations thereof.

[0016] Additionally, first computer 21 may have access to data files containing data descriptions of music, by way of example and not limitation such as MIDI formatted files. MIDI formatted files are typically condensed descriptions of music but depend on sound synthesis equipment at a computer to reconstruct music using the MIDI files. Additionally, MIDI is not capable of reproducing voiced sounds.

[0017] Second computer, e.g. 22, may also be present such as in a multiplayer game scenario and be operatively connected to data network 100, either directly or via local area network 30 such as by gateway software. Audio files 12a, 12b, and 12c, by way of example and not limitation high quality wave files, will be present at or otherwise locally accessible to second computer 22 such as resident on data store 10 directly connected to second computer 22, via local area network 30, or a combination thereof, and are associatable with at least one of the categories. Software executing in second computer 22 will be responsive to category data sent by first computer 21 to select a desired audio file 12a, 12b, 12c. In currently envisioned embodiments, second computer 22 may further comprise one or more sound cards capable of producing MIDI, wave table, or combinations thereof. Therefore, second computer 22 may be used to reproduce recorded audio files 12a, 12b, and 12c such as wave files, sounds using music data

descriptors such as MIDI, or a combination thereof. Additionally, each audio file 12a,12b,12c may comprise an entire audio work or some portion of that work.

[0018] As used herein, each of computers 21,22,23,24 may be connected to data network 100 via modems or routers such as DSL routers, cable routers, and the like. Additionally, as data network 100 may further include local area network 30, computers 21,22,23,24 may be connected to local area network 30 via LAN adapters.

[0019] **In the operation of an exemplary embodiment**, referring now to **Fig. 1** and **Fig. 2**, a flowchart of an exemplary embodiment, operation of an exemplary embodiment will be described in terms of interactive computer game play. However, this is by way of example and not of limitation as the inventions described herein are not limited by the description of this exemplary embodiment set out above but are only limited by the claims.

[0020] In game play, two game players may play opposite or in conjunction with each other, e.g. one game player at game computer 24 playing another game player at game computer 22. In this exemplary configuration, computer 21 or computer 23 may be acting as a game server. Game players often are able to configure other features of game play, including backgrounds, story lines, avatar capabilities, and the like.

[0021] Background audio such as music, speech, and noises can add to the ambience of the game play. Background audio that adapts to the context of the game play is more desirable than static audio such as static musical scores. However, game play progress, in part because of the human beings' decisions, are more often stochastic than deterministic.

[0022] Recognizing the stochastic nature of the game play, at predetermined intervals, either game computer 22, game computer 24, server computer 21, or a combination thereof may determine the current context of game play 120, i.e. the state of the software executing in either game computer 22 or game computers 22,24. This state is either communicated back to or otherwise determined by game computer 24 and/or to server computer 21.

[0023] In an embodiment, the present inventions may utilize audio data files (12) already present at game computer 22. Use of such files frees up data communications bandwidth as it provides a source of audio that does not have to be downloaded in realtime to suit the context of the game play. Additionally, a user may feel a personal sense of attachment to the game as it is playing music from their own collection. United States Patent 5,963,957 issued to Hoffberg for "BIBLIOGRAPHIC MUSIC DATA BASE WITH NORMALIZED MUSICAL THEMES," incorporated herein by reference, discloses mechanisms for categorizing music.

[0024] Audio files 12a, 12b, and 12c may be provided with the game application or may be separately available, such as files already present at game computers 22,24. The system may further include categorization software executable at game computers 22, 24. This categorization software will be capable of locating and categorizing audio files accessible to second computer 22. Such categorization software may be software capabilities in the game application or may include software external to the game application such as a utility or one or more operating system services.

[0025] Using the context, game computers 22,24 or server computer 21, depending on the configuration of game play, selects a category 122 associated with that

context from a set of categories that have been determined before game play, during game play but prior to the current context, or a combination thereof. The category is transmitted 124 to game computers 22,24, a process that consumes little bandwidth because the datagram required is fairly small.

[0026] Upon receipt of the datagram, software executing in game computers 22,24 selects an audio data file local to or otherwise accessible to game computers 22,24 and begins to play that audio data file 130, e.g. a wave file or a MIDI file or a combination thereof. Numerous methods exist to accomplish the playing of the audio, as will be familiar to those of ordinary skill in the computer sound software arts, by way of example and not limitation using ActiveX components or software such as WINAMP marketed by NULLSOFT, INC. or REALJUKEBOX marketed by RN, INC. of Seattle, WA.

[0027] If an audio data file is not present at either of game computers 22,24 that will satisfy the desired category, in a currently envisioned alternative embodiment game computers 22,24 or server computer 21 at 126, 128 may supply lower quality audio data or MIDI data to the game computer 22,24 lacking the audio data file.

[0028] In a currently preferred embodiment, game computer 24 and game computer 22 have their categorizations predetermined, such as by the game software to be executed or by server computer 21. One such method of categorization is described in United States serial number 09/792,145 (attorney docket US 018017) filed February 21, 2001 for "DATA STREAMING SYSTEM SUBSTITUTING LOCAL CONTENT FOR UNICASTS," incorporated herein by reference. Another such method is disclosed in United States Patent 5,963,957 issued to Hoffberg.

[0029] Additionally, a game player may be allowed to select a subset of categories 115 from a larger set of categories prior to game play and communicate that subset category data to the appropriate computer, e.g. game computers 22,24 or server computer 21.

[0030] In alternative embodiments, categorization may occur or change at or during predetermined events, by way of example and not limitation comprising concurrently with game play, at the initiation of game play, when game software is first installed or updated, periodically at predetermined intervals, or the like, or a combination thereof.

[0031] In other alternative embodiments, a computer such as server computer 21 may supply another computer, e.g. game computer 22, with audio files for use during play in a batch manner, either before or during game play. If the game computer is computer 22, computer 22 could access audio files, e.g. 12a,12b, and 12c, that are either local to data storage at computer 22 or over local area network 30 to files at another computer, e.g. computer 23.

[0032] In other game embodiments, game computer 22 may be part of a game environment such as role acted games in which humans don game gear and play against each other such as with laser or light "weapons."

[0033] Although the above exemplary embodiment has been described for game play, the present inventions may be used in numerous other embodiments. In a currently envisioned embodiment, a user may be presented with categories associated with a retail enterprise and be able to select music for fee or purchase that is appropriate with the contexts of additional software, e.g. a catalog. In this embodiment, server computer 21

may provide selections of music as samples or otherwise given the context of the catalog being viewed.

[0034] In a similar embodiment, a user such as a computer 24 may be provided with one or more music selections depending on the context of a search for music or other files. By way of further example and not limitation, during a context of the executable software, e.g. the game software, a user may hear a snippet or allowable portion of a selection and want to purchase that work or works like that work, e.g. a CDROM comprising that work. In this exemplary embodiment, the user may be able to provide feedback such as through a pop-up window or other means to first computer 21 whereby the user would be allowed to purchase the work or works like that work.

[0035] In a further currently envisioned embodiment, a user can have predetermined audio files locally stored at the user's computer, e.g. computer 22, and have the user's computer 22 or another computer such as server computer 21 automatically select which of the user's audio to play in the background during other use of the user's computer 22, e.g. be sensitive to the context of the user's work such as editing documents, entering data, composing patent applications, and the like.

[0036] It will be understood that various changes in the details, materials, and arrangements of the parts which have been described and illustrated above in order to explain the nature of these inventions may be made by those skilled in the art without departing from the principle and scope of the inventions as recited in the following claims.